IN THE CLAIMS

1 (Original): An always-on wireless internet protocol (IP) network, comprising:

an access provider network (APN) including an always-on packet data serving node (PDSN), the APN being operable to communicate over a wireless communication link with a mobile station;

the PDSN including an inactivity timer, the PDSN being operable to set the inactivity timer to an inactivity timer starting value and send a starting value estimate to the mobile station over the wireless communication link, wherein the starting value estimate is a function of the inactivity timer starting value;

the mobile station including an inactivity timer estimate, the mobile station being operable to receive the starting value estimate and set the inactivity timer estimate to the starting value estimate; and

the mobile station being further operable to reset the inactivity timer estimate to the starting value estimate when the mobile station communicates with the APN.

2 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the mobile station includes a mobile station module that sets and resets the inactivity timer estimate.

3 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the inactivity timer starting value is a maximum value and wherein the PDSN decrements the inactivity timer from the maximum value when there is no data activity on the wireless communication link.

4 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the starting value estimate is a maximum value and wherein the mobile station decrements the inactivity timer estimate from the maximum value when there is no data activity on the wireless communication link.

5 (previously presented): The always-on wireless internet protocol (IP) network of claim 4, wherein the wireless communication link between the mobile station and the APN is maintained until the inactivity timer estimate is decremented to a pre-selected value.

6 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein if the inactivity timer estimate reaches a pre-selected value, then the mobile station being configured to enter an inactive state.

7 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein if the inactivity timer estimate reaches a pre-selected value, then the mobile station being configured to establish a new wireless communication link between the mobile station and the APN.

8 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, where the wireless communication link between the APN and the mobile station is a point-to-point protocol (PPP) session.

9 (previously presented): The always-on wireless internet protocol (IP) network claim 8, wherein the PDSN is operable to send the starting value estimate to the mobile station upon entering an IP control protocol (IPCP) open state on the PPP session.

10 (Currently Amended): The always-on wireless internet protocol (IP) network of claim 1, wherein the PDSN is operable to send an updated starting value estimate to the mobile station if the inactivity timer starting value is modified.

11 (Currently Amended): The always-on wireless internet protocol (IP) network of claim 1, wherein the always-on wireless IP network is a CDMA2000 network

12 (Currently Amended): The always-on wireless internet protocol (IP) network of claim 8, wherein starting value estimate is included in a link control protocol (LCP) message transmitted from the APN to the mobile station.

13 (Currently Amended): The always-on wireless internet protocol (IP) network of claim 12, wherein the LCP message is an Echo-Request message.

14 (Currently Amended): The always-on wireless internet protocol (IP) network of claim 8, wherein the mobile station module resets the inactivity timer estimate to the starting value estimate in response to the mobile station successfully sending an Echo-Reply message to the APN.

15 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the mobile station module resets the inactivity timer estimate to the starting value estimate in response to the mobile station receiving an Echo-Request message from the APN.

16 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the mobile station module resets the inactivity timer estimate to the starting value estimate in response to PPP activity between the mobile station and the APN.

17 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the PDSN includes an always-on PDSN module that is operable to monitor activity on the wireless communication link between the APN and the mobile station and reset the inactivity timer to the inactivity timer starting value if activity is detected.

18 (previously presented): The always-on wireless internet protocol (IP) network of claim 1, wherein the inactivity timer estimate is equal to the inactivity timer starting value.

19 (previously presented): The always-on wireless internet protocol (IP) network of claim 8, wherein the inactivity timer is a PPP inactivity timer.

20 (previously presented): The always-on wireless internet protocol (IP) network of claim 19, wherein the inactivity timer starting value is a maximum PPP timer value.

21 (previously presented): The always-on wireless internet protocol (IP) network of claim 19, wherein the PDSN is operable to send an LCP request message to the mobile station if the PPP inactivity timer reaches a pre-selected value.

22 (previously presented): The always-on wireless internet protocol (IP) network of claim 21, wherein the PDSN includes an Echo-Reply-Timeout timer, and wherein the PDSN is operable to reset the Echo-Reply-Timeout timer to an Echo-Reply-Timeout timer starting value and reset the PPP inactivity timer to the inactivity timer starting value if the APN receives a PPP message from the mobile station.

23-24 (Canceled)

25 (currently amended): The always-on wireless internet protocol (IP) network of claim 22, wherein the PDSN includes an Echo-Request-Retries counter, and wherein if the Echo-Reply-Timeout counter reaches a pre-determined value, then the PDSN being configured to resend ~~the~~ an Echo-Request message to the mobile station and reset the Echo-Request-Retries counter from a starting value to identify a number of times that the PDSN attempts to send the Echo-Request message to the mobile station without receiving an Echo-Reply message from the mobile station.

26 (previously presented): The always-on wireless internet protocol (IP) network of claim 25, wherein if the Echo-Request-Retries counter reaches a pre-selected cutoff value, then the PDSN being configured to close the PPP session.

27-28 (Canceled)

29 (Original): A method of maintaining an always-on wireless communications link between a mobile station and an access provider network (APN), comprising:

establishing a wireless communication link between the mobile station and the APN;

setting an inactivity timer in the APN to an inactivity timer starting value;

sending a starting value estimate from the APN to the mobile station that is a function of the inactivity timer starting value;

setting an inactivity timer estimate in the mobile station to the starting value estimate;

monitoring the wireless communication link between the mobile station and the APN for data traffic between the mobile station and the APN; and

if data traffic is detected, then resetting the inactivity timer estimate in the mobile station to the starting value estimate and resetting the inactivity timer in the APN to the inactivity timer starting value.

30 (Original): The method of claim 29, further comprising:

if the inactivity timer estimate reaches a pre-selected value, then establishing a new wireless communication link between the mobile station and the APN or causing the mobile station to enter an inactive state.

31 (Original): The method of claim 29, wherein the wireless communication link is a point-to-point protocol (PPP) session.

32 (Original): The method of claim 31, wherein the starting value estimate is included in a link control protocol (LCP) message transmitted from the APN to the mobile station.

33 (Original): The method of claim 32, wherein the LCP message is an Echo-Request message.

34 (Original): The method of claim 31, further comprising:

if the inactivity timer in the APN reaches a pre-determined value, then transmitting a link control protocol (LCP) Echo-Request message from the APN to the mobile station.

35 (Original): The method of claim 34, wherein if the inactivity timer in the APN reaches the pre-determined value, then resetting an Echo-Reply-Timeout timer in the APN.

36 (Original): The method of claim 35, wherein if the inactivity timer in the APN reaches the pre-determined value, then resetting an Echo-Request-Retries counter in the APN.

37 (Original): The method of claim 36, further comprising:

monitoring the wireless communication link for an Echo-Reply message from the mobile station;

if an Echo-Reply message from the mobile station is detected, then resetting each of the Echo-Reply-Timeout timer, the Echo-Request-Retries counter and the inactivity timer;

if the Echo-Reply-Timeout timer reaches a selected value, then incrementing or decrementing the Echo-Request-Retries counter and transmitting an additional LCP Echo-Request message from the APN to the mobile station; and

if the Echo-Request-Retries counter is incremented or decremented to a set value and the Echo-Reply-Timeout timer reaches the selected value, then closing the PPP session.

38 (Original): In an always-on wireless internet protocol (IP) network including an access provider network (APN) with an always-on packet data serving node (PDSN), the APN being operable to send and receive data over a wireless communication link with a mobile station, and the PDSN being operable to set an inactivity timer to an inactivity timer starting value and to send a starting value estimate to the mobile station over the wireless communication link that is a function of the inactivity timer starting value, the mobile station comprising:

means for transmitting and receiving data over the wireless communication link, including the starting timer estimate;

a timer;

a mobile station module operable to set the timer to the starting timer estimate when the starting timer estimate is received from the PDSN and further operable to reset the timer to the starting timer estimate when the mobile station transmits data to the APN or receives data from the APN.

39 (Original): The mobile station of claim 38, wherein if the timer reaches a pre-selected value, then the mobile station being operable to initiate a new wireless communication link with the APN or enter an inactive state.

40 (Original): The mobile station of claim 38, wherein the wireless communication link is a point-to-point protocol (PPP) session.

41 (Original): The mobile station of claim 40, wherein the mobile station receives the starting value estimate from the PDSN upon entering an IP control protocol (IPCP) open state on the PPP session.

42 (Original): The mobile station of claim 40, wherein the wireless IP network is a CDMA2000 network.

43 (Original): In an always-on wireless internet protocol (IP) network including a mobile station having an inactivity timer estimate, the mobile station being operable to transmit and receive data over a wireless communication link with an access provider network (APN), receive a starting value estimate from the APN and set the inactivity timer estimate to the starting value estimate, the mobile station being further operable to reset the inactivity timer estimate to the starting value estimate when the mobile station transmits data to the APN, the APN comprising:

an always-on packet data serving node (PDSN) that includes an inactivity timer;

the PDSN operable to set the inactivity timer to an inactivity timer starting value; and

the PDSN further operable to send the starting value estimate over the wireless communication link to the mobile station, wherein the starting value estimate is a function of the inactivity timer starting value.

44 (Original): In an always-on wireless internet protocol (IP) network including an access provider network (APN) operable to send and receive data over a wireless communication link with a mobile station, the APN being further operable to set an inactivity timer in the APN to an inactivity timer starting value, a method comprising:

transmitting a starting value estimate over the wireless communication link to the mobile station using a protocol stack that includes a point-to-point protocol (PPP) layer;

wherein the starting value estimate is a function of the inactivity timer starting value; and

wherein the mobile station is operable to set an inactivity timer estimate to the starting value estimate and reset the inactivity timer estimate to the starting value estimate when the mobile station transmits data to the APN.

45 (currently amended): A packet data serving node ("PDSN") configured to maintain an always-on wireless communication link with a mobile station in a wireless communication network, the PDSN comprising:

an inactivity timer, the inactivity timer configured to start upon the PDSN entering a packet data session;

a transceiver, the transceiver configured to send a starting value estimate that is a function of an inactivity timer starting value;

a processor coupled to transceiver, the processor configured to monitor the always-on wireless communication link between the mobile station and the PDSN for data traffic between the mobile station and the PDSN; and

an always-on PDSN module coupled to the processor and the inactivity timer, the always-on PDSN module configured to reset the inactivity timer to the inactivity timer starting value if the processor detects data traffic.

46 (Previously Presented): The PDSN of claim 45, wherein the packet data session includes a point-to-point ("PPP") session.

47 (Previously Presented): The PDSN of claim 46, wherein the inactivity timer includes a PPP inactivity timer.

48 (Previously Presented): The PDSN of claim 47, wherein the inactivity timer is further configured to start upon the PDSN entering an Internet Protocol control ("IPCP") opened state on a PPP session.

49 (Previously Presented): The PDSN of claim 45, wherein the starting value estimate is the inactivity timer starting value.

50 (Previously Presented): The PDSN of claim 45, wherein the inactivity timer starting value is a maximum PPP timer value.

51 (Previously Presented): The PDSN of claim 45, wherein the wireless communication network is a CDMA2000 network.

52 (Previously Presented): The PDSN of claim 45, wherein the transceiver is further configured to transmit a link control protocol ("LCP") message that includes the starting value estimate.

53 (Previously Presented): The PDSN of claim 52, wherein the LCP message includes an Echo-Request message.

54 (Previously Presented): The PDSN of claim 53, wherein the transceiver is further configured to transmit an LCP Echo-Request message if the inactivity timer reaches a pre-determined value.

55 (Previously Presented): The PDSN of claim 54, wherein the always-on PDSN module is further configured to initialize an Echo-Reply-Timeout timer if the inactivity timer reaches the pre-determined value.

56 (Previously Presented): The PDSN of claim 55, wherein the always-on PDSN module is further configured to initialize an Echo-Request-Retries counter if the inactivity timer reaches the pre-determined value.

57 (Previously Presented): The PDSN of claim 56, wherein the always-on PDSN module is further configured to monitor the wireless communication link for an Echo-Reply message, and to reset each of the Echo-Reply-Timeout timer, the Echo-Request-Retries counter and the inactivity timer if the always-on PDSN module detects an Echo-Reply message.

58 (Previously Presented): The PDSN of claim 57, wherein:

the always-on PDSN module is further configured to increment or decrement the Echo-Request-Retries counter, and

the transceiver is further configured to transmit an additional LCP Echo-Request message if the Echo-Reply-Timeout timer reaches a selected value.

59 (Previously Presented): The PDSN of claim 58, wherein the always-on PDSN module is further configured to close the session if the Echo-Request-Retries counter is incremented or decremented to a set value and the Echo-Reply-Timeout timer reaches the selected value.

60 (Previously Presented): The PDSN of claim 45, wherein:

the transceiver is further configured to receive at least one data packet for the packet data session, and

the always-on PDSN module is further configured to stop the Echo-Reply Timeout timer and to reset each of the Echo-Reply Timeout timer, the Echo-Request-Retries counter, and the inactivity timer, if the transceiver receives at least one data packet for the packet data session.

61 (Previously Presented): The PDSN of claim 45, wherein the at least one data packet is a point-to-point ("PPP") packet and the packet data session is a PPP session.

62 (Previously Presented): A method of maintaining an always-on wireless communication link in a packet data serving node ("PDSN"), the method comprising:

entering a packet data session;

starting an inactivity timer for the packet data session;

sending a starting value estimate that is a function of an inactivity timer starting value;

monitoring the always-on wireless communication link for data traffic; and

if data traffic is detected, then resetting the inactivity timer to the inactivity timer starting value.

63 (Previously Presented): The method of claim 62, wherein entering the packet data session includes entering a point-to-point ("PPP") session.

64 (currently amended): The method of claim 63, wherein entering the packet data session includes entering an Internet Protocol control protocol ("IPCP") opened state on ~~a~~ the PPP session.

65 (Previously Presented): The method of claim 63, wherein the inactivity timer is a PPP inactivity timer.

66 (Previously Presented): The method of claim 62, wherein sending the starting value estimate that is a function of an inactivity timer starting value includes:

sending a link control protocol ("LCP") message including the starting value estimate.

67 (Previously Presented): The method of claim 66, wherein the LCP message includes an Echo-Request message.

68 (Previously Presented): The method of claim 67, further comprising:

if the inactivity timer reaches a pre-determined value, then transmitting an LCP Echo-Request message.

69 (Previously Presented): The method of claim 68, further comprising:

if the inactivity timer reaches the pre-determined value, then initializing an Echo-Reply-Timeout timer.

70 (Previously Presented): The method of claim 69, further comprising:

if the inactivity timer reaches the pre-determined value, then initializing an Echo-Request-Retries counter.

71 (currently amended): The method of claim 70, further comprising:

monitoring the wireless communication link for an Echo-Reply message;

if an Echo-Reply message is detected, then resetting each of the Echo-Reply-Timeout timer, the Echo-Request-Retries counter and ~~the~~ a PPP inactivity timer;

if the Echo-Reply-Timeout timer reaches a selected value, then incrementing or decrementing the Echo-Request-Retries counter and transmitting an additional LCP Echo-Request message; and

if the Echo-Request-Retries counter is incremented or decremented to a set value and the Echo-Reply-Timeout timer reaches the selected value, then closing ~~the~~ a PPP session.

72 (currently amended): The method of claim 63, further comprising:

receiving at least one data packet for the packet data session,

stopping ~~the~~ an Echo-Reply Timeout timer; and

resetting each of the Echo-Reply Timeout timer, the Echo-Request-Retries counter, and the inactivity timer.

73 (Previously Presented): The method of claim 72, wherein receiving at least one data packet for the packet data session includes receiving at least one PPP packet for the PPP session.

74 (Previously Presented): A mobile station configured to be operable in an always-on wireless internet protocol ("IP") network, the mobile station comprising:

an inactivity timer estimate module;

a transceiver, the transceiver configured to receive a starting value estimate over a wireless communication link; and

an always-on mobile station module coupled to the inactivity timer estimate module and to the transceiver, the always-on mobile station module configured to set the inactivity timer estimate module to the starting value estimate.

75 (Previously Presented): The mobile station of claim 74, wherein the starting value estimate is a function of an inactivity timer starting value.

76 (Previously Presented): The mobile station of claim 75, wherein the inactivity timer estimate module is equal to the inactivity timer starting value.

77 (Previously Presented): The mobile station of claim 74, wherein the always-on mobile station module is further configured to reset the inactivity timer estimate module to the starting value estimate when the mobile station communicates with a packet data serving node ("PDSN").

78 (currently amended): The mobile station of claim 74, wherein the starting value estimate is a maximum value and wherein the mobile station decrements the inactivity timer estimate module from the maximum value when there is no data activity on the wireless communication link.

79 (currently amended): The mobile station of claim 78, wherein the wireless communication link is maintained until the inactivity timer estimate module is decremented to a pre-selected value.

80 (currently amended): The mobile station of claim 74, wherein the mobile station is further configured to enter an inactive state if the inactivity timer estimate module reaches a preselected value.

81 (currently amended): The mobile station of claim 74, wherein the mobile station is further configured to establish a new wireless communication link if the inactivity timer estimate module reaches a preselected value.

82 (Previously Presented): The mobile station of claim 74, where the wireless communication link is a point-to-point protocol ("PPP") session.

83 (Previously Presented): The mobile station of claim 82, wherein the always-on mobile station module is further configured to reset the inactivity timer estimate module to the starting value estimate in response to the mobile station successfully sending an Echo-Reply message.

84 (Previously Presented): The mobile station of claim 82, wherein the always-on mobile station module is further configured to reset the inactivity timer estimate module to the starting value estimate in response to the mobile station receiving an Echo-Request message.

85 (Previously Presented): The mobile station of claim 82, wherein the always-on mobile station module is further configured to reset the inactivity timer estimate module to the starting value estimate in response to PPP activity involving the mobile station.

86 (currently amended): The mobile station of claim 82, wherein the inactivity timer estimate module is a PPP inactivity timer.

87 (currently amended): The mobile station of claim 86, wherein the ~~inactivity timer~~ starting value estimate is a maximum PPP timer value.

88 (Previously Presented): The mobile station of claim 74, wherein the always-on wireless IP network is a CDMA2000 network.

89 (Previously Presented): The mobile station of claim 74, wherein the starting value estimate is included in a link control protocol ("LCP") message received by the transceiver.

90 (Previously Presented): The mobile station of claim 89, wherein the LCP message is an Echo-Request message.

91 (Previously Presented): A method in a mobile station for maintaining an always-on wireless communication link, comprising:

establishing a wireless communication link;

receiving a starting value estimate;

setting an inactivity timer estimate to the starting value estimate;

monitoring the wireless communication link for data traffic; and

if data traffic is detected, then resetting the inactivity timer estimate to the starting value estimate.

92 (Previously Presented): The method of claim 91, further comprising:

if the inactivity timer estimate reaches a pre-selected value, then establishing a new wireless communication link.

93 (Previously Presented): The method of claim 92, wherein the wireless communication link is a point-to-point protocol ("PPP") session.

94 (Previously Presented): The method of claim 93, wherein receiving the starting value estimate includes:

receiving a link control protocol ("LCP") message including the starting value estimate.

95 (Previously Presented): The method of claim 94, wherein the LCP message is an Echo-Request message.

96 (Previously Presented): The method of claim 91, further comprising:

if the inactivity timer estimate reaches a pre-selected value, then causing the mobile station to enter an inactive state.

97 (Previously Presented): The method of claim 96, wherein the wireless communication link is a point-to-point protocol ("PPP") session.

98 (Previously Presented): The method of claim 97, wherein the starting value estimate is included in a link control protocol ("LCP") message.

99 (Previously Presented): The method of claim 98, wherein the LCP message is an Echo-Request message.